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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,931	06/04/2001	Robert D. Horning	H16-16009 US	4429
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John G. Shudy, Jr. Patent Services Honeywell International Inc. 101 Colombia Road Morristown, NJ 07962				
EXAMINER RAO, SHRINIVAS H				
ART UNIT 2814		PAPER NUMBER		

DATE MAILED: 12/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/873,931

Applicant(s)

HORNING ET AL.

Examiner

Steven H. Rao

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(e). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 19-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Response to Amendment

Applicants' amendment filed on September 08, 2003 has been entered on September 24, 2003.

Therefore claims 19 and 28 as amended by the amendment and claims 20-27 and 29-36 as originally filed are currently pending in the application.

Claims 1-18 have been cancelled by the amendment.

Drawings

The corrected drawings filed on September 08, 2003 along with the amendment have been accepted by the draftsman (Mr. Son Lam on November 20, 2003).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 19-21 and 28-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Wu et al. (U.S. Patent No. 6,521,041, herein after Wu).

With respect to claim 19, Wu describes a device produced according to the method of making a silicon micro mechanical structure comprising the steps of :

Forming a lightly doped silicon substrate having a first and second side and having less than $5 \times 10^{19} \text{ cm}^{-3}$ boron therein ; (Wu lightly doped silicon substrate

having first and second side and less than $5 \times 10^{19} \text{ cm}^{-3}$ boron therein – Wu fig. 1Dcol. 4 line 29).

Placing a p+ layer on the first side of said substrate, said p+ layer having a boron content of greater than $7 \times 10^{19} \text{ cm}^{-3}$ and a germanium content of about $1 \times 10^{21} \text{ cm}^{-3}$: (Wu – boron -abstract line14, Germanium _ Wu col. 6 lines 49-55, Figures 1 A and B col. 10 lines 20-25).

forming a mask on the second side for etching a predetermined pattern;(Wu col. 8 lines 5-10, 30-40).

etching said second side to said p+ layer ; (Wu col. 8 lines 6-7 and 35-40) and depositing an insulator on said p+ layer and fabricating an electronic component on said insulator. (Wu insulator fig. 10 in the embodiment when layer 1008 is bulk insulating material, col.13 lines 50-54 – col. 14 lines 7-10).

fabricating an electronic component on said insulator and electronic components (Wu col. 7 lines 50-60).

With respect to claim 20, Wu describes the device of claim 19, wherein said boron content is greater than $1 \times 10^{20} \text{ cm}^3$ (Wu col. 4 line 51)and the germanium content is from about $0.5 \times 10^{21} \text{ cm}^{-3}$ to about $2.0 \times 10^{21} \text{ CM}^3$. (Wu col. 10 line 20-25).

With respect to claim 21 Wu describes the device of claim 19, wherein said micromechanical. structure is a pressure sensor. (Wu col. 7 lines 54,58-59).

With respect to claim 28, Wu describes a device produced according to the method of claim 10. Claim 28 repeats the elements of claim 19 and recites an buried p+ layer below the lightly doped layer (WU figure 1D).

With respect to claim 29, Wu describes the device of claim 28, wherein said boron content is greater than $1 \times 10^{20} \text{ cm}^{-3}$ (Wu col. 4 line 51) and the germanium content is from about $0.5 \times 10^{21} \text{ cm}^{-3}$ to about $2.0 \times 10^{21} \text{ CM}^{-3}$. (Wu col. 10 line 20-25).

With respect to claim 30, Wu describes the device of claim 28, wherein said micromechanical structure is a pressure sensor. (Wu col. 7 lines 54,58-59).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 22, 27 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (U.S. Patent No. 6,521,041, herein after Wu) as applied to claims 19-21 above and in view of Stemme et al. (U.S. Patent No. 6,546,804, herein after Stemme).

With respect to claims 22 and 31 Wu describes the device of claim 21.

Wu does not specifically describe the electronic component is selected from the group consisting of dielectrically isolated piezoresistors and resonant microbeams.

However Stemme in col. 4 lines 11-12 and col. 7 lines 14 describes electronic component is selected from the group consisting of dielectrically isolated piezoresistors and resonant microbeams to form ultraminiaturized sensors having high sensitivity in a cost effective manner .

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to specify Stemme's dielectrically isolated piezoresistors and resonant microbeams for the unspecified sensors of Wu in Wu's device to form ultraminiaturized sensors having high sensitivity in a cost effective manner . (Stemme col. 2 lines 38-48).

With respect to claim 27 The device of claim 19, wherein said micromechanical structure includes a dielectrically isolated piezoresistor formed on a top surface of a first wafer, a second wafer is bonded to said first wafer, and said second wafer forms a single crystal piezoresistor. (Stemme fig. 16 and col. 2 lines 20-36 Wu figure 10).

B. Claims 23 to 26 , 32 to 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (U.S. Patent No. 6,521,041, herein after Wu) and Stemme et al. (U.S. Patent No. 6,546,804, herein after Stemme) as applied to claims above and further in view of Nilsson et al. (U.S. Patent No. 6,252,335, herein after Nilsson).

With respect to claims 23 and 32 Wu describes the device of claim 19. Wu and Stemme do not specifically describe the micromechanical structure is a cantilevered accelerometer.

However Nilsson in its abstract line 1, etc. describes a cantilevered beam accelerometer to obtain a beam sensor that is small, very sensitive but with minimal orthogonal sensitivity and is highly resistant to shocks.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include Nilsson's cantilevered accelerometer as the beam sensor described by Wu and Stemme in their (Wu and Stemme's) devices to obtain a beam sensor that is small, very sensitive but with minimal orthogonal sensitivity and is highly resistant to shocks. (Nilsson col. 1 lines 45 to 52).

With respect to claims 24 and 33 Wu, Stemme and Nilsson describe the device of claim 23, wherein said electronic component is selected from the group consisting of dielectrically isolated piezoresistors and resonant microbeams. (Stemme in col. 4 lines 11-12 and col. 7 lines 14).

With respect to claims 25 and 34 Wu, Stemme and Nilsson describe the device of claim 19, wherein said micromechanical structure is a dual web biplane accelerometer formed by forming a said p+ layer on both sides of said substrate, forming a proof mask and flexure etching on both sides of said layer until said etching reaches said p+ layers. (Nilsson figure 1, figure 6, col. 4 lines 33 to 44).

With respect to claims 26 and 35 Wu, Stemme and Nilsson the device of claim 25, wherein said electronic component is selected from the group consisting of dielectrically isolated piezoresistors and resonant microbeams. (Stemme in col. 4 lines 11-12 and col. 7 lines 14).

With respect to claims 31 and 35 Wu, Stemme and Nilsson describe the device of claim 30, wherein said electronic component is selected from the group consisting of dielectrically isolated piezoresistors and resonant microbeams.

With respect to claims 32 and 36 Wu, Stemme and Nilsson describe the device of claim 28, wherein said micromechanical structure is a cantilevered accelerometer.

Response to Arguments

Applicant's arguments filed September 24, 2003 have been fully considered but they are not persuasive for the following reasons :

Applicants' first contention that the Wu reference can be distinguished over the presently recited claims 19 and 28 and dependent claims 20 and 29 (different Ge content range- see rejection above) because the independent claims 19 and 28 recite their silicon doped with about 1 % (i.e. recite " a germanium content of about $1 \times 10^{21} \text{ cm}^{-3}$ ") is not persuasive for the following reasons :

(a) Applicants' arguments are not consummate in scope with the presently recited claims because the claims recite, "" a germanium content of about $1 \times 10^{21} \text{ cm}^{-3}$ " which recitation does not exclude any range over the alleged 1 %.(e.g 1-20 %).

If Applicants' want to distinguish on the above mentioned basis then the claims may recite e.g. " no more than about 1 %" which will exclude the higher percentages of germanium from the scope of the claims.

(b) Assuming arguendo that Applicants' have recited " no more than about 1 %", Wu contrary to Applicants' contention describes its structure as including plurality of

graded relaxed layers (Col. 8 lines 45-46) wherein the device has SiGe wherein the Ge content is graded from the bottom surface up to the top surface, including up to zero percent at the top surface (as also seen from fig. 1A, D and figure 5, Abstract lines 7-8, etc.).

(c) Wu teachings should not be limited to its upper end (18%) of the range of the Ge content in the SiGe layers because Wu teaches SiGe layers with "germanium content less than approximately 18" (col.46 lines 63-65) which range includes all percentages between 0 (lower end) to 18 (upper end) percent, which percentage range overlaps and includes Applicants' about 1 % . Further Wu in col. 7 lines 18 describes (5 to 10%) and line 19 describes (5 to 15%) and Applicants' claims 20 and 29 describe about 2 %.

(d) Assuming *arguendo* that Applicants' have recited " no more than about 1 % ", the Specification as originally filed contains no disclosure of either the critical nature of the claimed range (about 1 % of Ge) nor any unexpected results arising therefrom. Where patentability is said to be based upon particular range or another value recited in the claim, the Applicant must show the chosen ranges are critical. In *re Woodruff*, 919 F. 2d 1575, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Contrary to Applicants' second contention Wu teaches silicon that is doped with boron (e.g. col.4 lines 44-45) and germanium (e.g. Abstract last 5 lines).

Applicants' third contention that Wu is totally silent about silicon doped with boron and about 1 % germanium is not persuasive for reasons set out above (e.g. present scope of the claims , Wu's teaching of less than 18 % includes the range 1- to 18 %).

Applicants' fourth contention Wu eliminates boron is wrong because Wu describes its device as including a layer of Silicon doped with boron (e.g. col.4 lines 44-45) .

The remaining claims (21-27 and 30-36) were alleged to be allowable because of the alleged Wu's deficiencies , because as shown above Wu teaches all the presently recited limitations in claims 19-20 and 28-29 and therefore those of claims 21-27 and 30-36 also.

THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Steven H. Rao whose telephone number is (703) 306-5584. The examiner can normally be reached on Monday- Friday from approximately 7:00 a.m. to 5:30 p.m.

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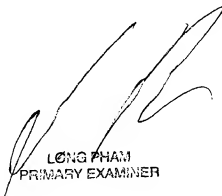
Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956. The Group facsimile number is (703) 308-7724.



Steven H. Rao

Patent Examiner

November 20, 2003.



LONG PHAM
PRIMARY EXAMINER